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EXAMINER

KALAFUT, STEPHEN J

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 02/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/091,335	Applicant(s) CHO ET AL.	
	Examiner Stephen J. Kalafut	Art Unit 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-46 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3/6/02</u> . | 6) <input checked="" type="checkbox"/> Other: ____ |

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Claims 1-46 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The term "conductive polymeric dispersant", as presently used, is confusing. The various polymers listed in claim 19 as examples of this dispersant are either known as ionically conductive, or non-conductive. Whether the polymer itself or the "mixture" (of the dispersant and the conductive agent) is conductive, and whether the conductivity is electrical or ionic, are unclear. Claims 18 and 32 recite "an average particle diameter" for the coating, but the parent claims 1 and 21 do not require the coating to be particulate or to contain particles. There is no antecedent for "the carbon-based material" in claim 8, or its parent claims 1 and 2. Should claim 8 depend on claim 7? Claim 20 is confusing because it recites the weight fraction of the polymer dispersant as if it is part of the conductive agent, when it is recited in claim 1 as a separate component mixed with the conductive agent.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(c) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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Claims 1, 13 and 19 are rejected under 35 U.S.C. 102(a) as being anticipated by Hoshino *et al.* (Japanese 2001-202,958).

Hoshino *et al.* disclose an active material composition of silver oxide, which may undergo oxidation-reduction reactions, coated with carbon, a conductive agent. See the Abstract. Since claim 19 limits the type of dispersant, but does not require a dispersant to be present, it is anticipated even though Hoshino *et al.* do not disclose a dispersant.

Claims 1, 13, 19, 21, 30, 36 and 42 are rejected under 35 U.S.C. 102(b) as being anticipated by Shinyashiki *et al.* (Japanese 11-307,116).

Shinyashiki *et al.* disclose an anode of cadmium, which undergoes oxidation-reduction reactions, coated with carbon, a conductive agent (section 0007). The anode includes a current collector (section 0014), and is combined with a cathode and a separator (section 0028) to form a cell. The process of coating the cadmium with carbon would meet claim 36. The assembly of these components would meet method claim 42. Since claim 19 limits the type of dispersant, but does not require a dispersant to be present, it is anticipated even though Shinyashiki *et al.* do not disclose a dispersant.

Claims 1, 13, 16, 17, 19, 21, 30, 31, 36 and 42 are rejected under 35 U.S.C. 102(a) and (e) as being anticipated by Sakamoto *et al.* (US 6,255,019).

Sakamoto *et al.* disclose a cathode material of nickel hydroxide, which undergoes oxidation-reduction reactions, coated with conductive cobalt oxide (column 4, lines 39-48). The amount of cobalt oxide may be as low as 1 weight percent (column 4, lines 62-65). These

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materials are packed into a nickel current collector (column 6, lines 30-35). The resulting cathode is combined with a separator and an anode to form a battery (column 6, lines 56-59), the assembling procedure thus meeting claim 42. The process of coating the NiOOH with cobalt oxide would meet claim 36. Since claim 19 limits the type of dispersant, but does not require one to be present, it is anticipated even though Sakamoto *et al.* do not disclose a dispersant.

Claims 1, 13, 19, 21, 30, 36 and 42 are rejected under 35 U.S.C. 102(a) and (e) as being anticipated by Abe (US 6,258,483).

Abe discloses a cathode of nickel hydroxide, which undergoes oxidation-reduction reactions, coated with conductive cobalt hydroxide (column 6, lines 23-31 and 53-63). The materials are supported on a nickel current collector (column 6, lines 20-22). The process of coating the NiOOH with CoOOH would meet claim 36. The cathode is combined with a separator and an anode to form a battery (column 11, lines 57-66), the assembling procedure thus meeting claim 42. Since claim 19 limits the type of dispersant, but does not require one to be present, it is anticipated even though Abe does not disclose a dispersant.

Claims 1, 13, 16, 17, 19, 21, 30, 31, 36 and 42 are rejected under 35 U.S.C. 102(a) and (e) as being anticipated by Ohta *et al.* (US 2001/0018148).

Ohta *et al.* disclose a cathode of nickel hydroxide, which undergoes oxidation-reduction reactions, coated with conductive cobalt hydroxide (sections 0031 and 0033). The materials are supported on a nickel current collector (section 0034). The process of coating the nickel hydroxide with the cobalt hydroxide would meet claim 36. The cathode is combined with an

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anode to form a battery (section 0040). While no separator is specifically mentioned, one would have to be present in order to make a "flooded cell-type battery (section 0040). The assembling procedure would meet claim 42. Since claim 19 limits the type of dispersant, but does not require one to be present, it is anticipated even though Ohta *et al.* do not disclose a dispersant.

Claims 1-3, 7, 13, 19, 21-23, 30, 36 and 42 are rejected under 35 U.S.C. 102(e) as being anticipated by Nimon *et al.* (US 6,537,701).

Nimon *et al.* disclose an anode of lithium, which undergoes oxidation-reduction reactions, coated with a lithium-aluminum alloy (column 6, lines 17-54). The anode includes a current collector (column 12, lines 27-32). The coating process would meet claim 36. The anode is combined with a cathode and a separator to form a battery (column 12, lines 10-17), the assembling procedure meeting claim 42. Since claim 19 limits the type of dispersant, but does not require one to be present, it is anticipated even though Nimon *et al.* do not disclose a dispersant. Likewise, claims 7 further limits the type of lithium intercalation compound broadly recited in claim 2, but does not require that this compound be the anode active material.

Claims 1, 2, 7, 9, 13, 19, 21, 22, 27, 36 and 42 are rejected under 35 U.S.C. 102(e) as being anticipated by Koga *et al.* (US 6,534,217).

Koga *et al.* disclose a cathode of a lithium composite oxide such as LiMn_2O_4 coated with a conductive oxide such as indium tin oxide (column 2, line 50 through column 3, line 43). The anode includes a current collector (column 4, lines 42-48). The coating process would meet claim 36. The anode is combined with a cathode and a separator to form a battery (column 5,

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lines 30-39), the assembling procedure meeting claim 42. Since claim 19 limits the type of dispersant, but does not require one to be present, it is anticipated even though Koga *et al.* do not disclose a dispersant.

Claims 1, 13, 16, 17, 19 and 36 are rejected under 35 U.S.C. 102(e) as being anticipated by Shinyama *et al.* (US 6,548,210).

Shinyama *et al.* disclose cathode of nickel hydroxide, which undergoes oxidation-reduction reactions, coated with a cobalt compound which provides conductivity (column 6, lines 12-34). The cathode includes a current collecting substrate (column 17, lines 28-34). The coating process would meet claim 36. The coating formed between 0.3 and 3.0 weight percent of the cathode material (column 8 lines 2-8). Since claim 19 limits the type of dispersant, but does not require a dispersant to be present, it is anticipated even though Shinyama *et al.* do not disclose a dispersant.

Claims 1-4, 7, 13, 16, 18, 19, 21-24, 30, 31, 33, 36, 42, 45 and 46 are rejected under 35 U.S.C. 102(e) as being anticipated by Nakagiri *et al.* (US 6,558,841).

Nakagiri *et al.* disclose a lithium anode, in which the material that undergoes oxidation-reduction reactions is an alloy of Li, Sn and another element, such as one in group 13 (column 5, lines 23-35). The alloy is coated with a conductive material (column 4, lines 49-61), which may include carbon, graphite, metal, or a conductive polymer (column 5, lines 33-65), as well as mixtures thereof (column 6, lines 19-20). Thus, Nakagiri *et al.* disclose a conductive coating which is a mixture of a conductive agent of carbon or a metal, and a conductive polymer. The

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process of making the coating (column 9, lines 8-44) would meet claim 36. The anode includes a current collector (column 11, lines 21-29). The anode is combined with a cathode (column 10, lines 5-32) and a separator (column 13, lines 19-23) to form a battery, this assembly process meeting claim 42. The coating may form as little as 5 weight percent of the anode (column 6, lines 32-41). The coating should be between 0.01 and 10 microns thick, the lower limit meeting claim 18, to the extent that it is understood. Claims 45 and 46 are in product-by-process format, and are thus examined for the patentability of the product, rather than the process steps. See MPEP 2113 and the cases cited therein. In these claims, the product would be a material which undergoes oxidation-reduction reactions, such as a Li anode, coated with a mixture of a conductive polymer and another conductive agent. As discussed immediately above, such materials are disclosed by Nakagiri *et al.*, which would thus also anticipate claims 45 and 46.

Claims 1, 13, 19, 21, 30, 36 and 42 are rejected under 35 U.S.C. 102(e) as being anticipated by either Nishiyama *et al.* (US 6,573,006) or Maeda *et al.* (US 6,338,917).

Nishiyama *et al.* disclose a cathode of nickel hydroxide, which undergoes oxidation-reduction reactions, coated with a metal nitride (column 2, lines 49-64). The coating process would meet claim 36. The cathode includes a current collector (column 5, lines 40-45), and is combined with a separator and an anode to form a battery (column 5, lines 56-60), the assembly process meeting claim 42.

Maeda *et al.* disclose a cathode of nickel oxide, which undergoes oxidation-reduction reactions, coated with a conductive material of metallic Co and Co oxides (column 3, lines 7-16), the coating process meeting claim 36. The cathode includes a current collector (column 3, line

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66 through column 4, line 5). The cathode is combined with an anode (column 4, lines 6-27) to form a battery. While no separator is specifically mentioned, one would have to be present since the electrolyte is liquid aqueous KOH (column 4, lines 19-23). The assembly process would meet claim 42.

Since claim 19 limits the type of dispersant, but does not require one to be present, it is anticipated even though neither Nishiyama *et al.* nor Maeda disclose a dispersant.

Claims 1, 13, 16, 17, 19, 21, 30, 36 and 42 rejected under 35 U.S.C. 102(e) as being anticipated by Ohta *et al.* (US 6,562,516).

Ohta *et al.* is applied for the same reasons as Ohta *et al.* (US 2001/0018148) above, but due to its issue date, is available only under subsection (e) of §102. These are two documents arising from the same application, and would thus be identical in content.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 10-12, 20 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakagiri *et al.*

-----These claims differ from Nakagiri *et al.* by reciting the particle size of the lithium-----
containing active material or the percentage of the polymer with respect to the conductive agent.

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Determining optimal values for these parameters is considered to be a matter within the skill of the ordinary artisan, who would be familiar with the effect of particle size on surface area and thus reaction kinetics, and with the tradeoff between mechanical stability afforded by a polymer and conductivity afforded by a conductive agent. See, for example, Nakagiri *et al.*, column 5, lines 34-36. These claims would thus be obvious over Nakagiri *et al.*, to the extent that they are understood.

Claims 5, 6, 15, 25, 26, 28, 29, 34, 35, 37-41, 43 and 44 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims. The prior art applied above, or cited either below or by applicants, does not disclose or teach the active materials of claims 5, 6, 25, 26, 28 and 29 coated with a conductive agent; the additional coating of claim 15; the specific polymers of claims 34 and 35; or the specific coating steps of claims 37-41, 43 and 44. Claim 8 is so indefinite as to preclude determining whether it distinguishes over the prior art.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Shackle (US 6,174,623) discloses electroactive V6O13 coated by a conductive polymer. Gauthier *et al.* (US 6,492,061) disclose an anode of lithium, coated by two solid electrolytes, including one which is organic.

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The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Kalafut whose telephone number is 571-272-1286. The examiner can normally be reached on Monday through Friday from 8:15 to 4:45.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on Monday through Thursday. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

sjk


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